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(54) BIODEGRADABLE COMPOUND, BIODEGRADABLE COMPOSITION AND METHOD FOR MOLDING THE SAME

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a biodegradable composition capable of utilizing waste materials and decomposed easily, and a method for molding the same.
SOLUTION: This biodegradable composition contains a biodegradable compound obtained by cross-linking a biodegradable compound having active hydrogen with a compound having ≥2 acryloyl groups, starch and urea. The biodegradable composition contains bentonite, a high boiling point water soluble organic solvent having hydrogen bonding property, a fibrous material originating from a natural raw material, a compound having a plural number of carbohydrazide groups or a compound having a plural number of amino groups.

CLAIMS

[Claim(s)]

[Claim 1] The biodegradability compound which constructed the bridge with the compound which has two or more acrylyl groups in the biodegradability compound which has active hydrogen.

[Claim 2] The biodegradability compound which constructed the bridge under acidity - neutrality with the compound which has two or more acrylyl groups in the biodegradability compound which has active hydrogen.

[Claim 3] The biodegradability compound which constructed the bridge under organic base existence with the compound which has two or more acrylyl groups in the biodegradability compound which has active hydrogen.

[Claim 4] The biodegradability compound which constructed the bridge with the compound which has two or more acrylyl groups in the biodegradability compound which has a urea and active hydrogen.

[Claim 5] The starch in which the biodegradability compound which has active hydrogen may have a substituent, The cellulose which may have a substituent, the glycerol which may polymerize, Claim 1 and the biodegradability compound given in two which are a polyethylene glycol, sucrose, a sorbitol, polyalkylene glycol diamino termination, and alkylene PORIORUTORISUPORI alkylene glycol triamino termination.

[Claim 6] Claims 1, 2, 3 and 4 and the biodegradability compound given in five whose acrylyl group is an acrylamide radical or an acrylic ester group.

[Claim 7] The biodegradability group living thing containing a biodegradability compound Claim 1, 2, 3, 4, 5, and given in six.

[Claim 8] The biodegradability group living thing containing a biodegradability compound the constituent containing starch and a urea and/or a stratified clay compound and Claim 1, 2, 3, 4, 5, and given in six.

[Claim 9] The biodegradable composition containing a biodegradability compound the fibrous material originating in a natural material, Claim 1, 2, 3, 4, 5, 6, 7, and given in eight.

[Claim 10] A biodegradable composition Claim 7 which contains further the compound

which has the compound which has two or more KARUBO hydrazide radicals, or two or more amino groups, 8, and given in nine.
[Claim 11] Claims 7, 8 and 9 which are that to which starch originates in rice, and a biodegradable composition given in ten.
[Claim 12] The high absorptivity ingredient containing a biodegradable composition Claim 7, 8, 9, 10, and given in 11.
[Claim 13] The high absorptivity ingredient containing a biodegradability surfactant according to claim 12.
[Claim 14] The building material containing a biodegradable composition Claim 7, 8, 9, 10, and given in 11.
[Claim 15] The greening material containing a biodegradable composition Claim 7, 8, 9, 10, and given in 11.
[Claim 16] Materials for agriculture containing a biodegradable composition Claim 7, 8, 9, 10, and given in 11.
[Claim 17] The coating containing a biodegradable composition Claim 7, 8, 9, 10, and given in 11.
[Claim 18] The recorded material containing a biodegradable composition Claim 7, 8, 9, 10, and given in 11.
[Claim 19] The molding method which makes a film configuration a biodegradability group living thing Claim 7, 8, 9, 10, and given in 11 by the casting method.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to a biodegradable composition. It is the thing about the biodegradable composition used for a high water absorption agent, building materials, an agricultural material, a greening material, a coating, or the recorded material for printing in detail to carry out.
[0002]
[Description of the Prior Art] In the current world, the plastics which used petroleum as the raw material is used for the large quantity. About this, the abolition method after an activity poses a big problem. That is, in reclamation abolition, in order to remain without rotting forever, the tooth space of a disposal field is becoming insufficient. Moreover, in order that very harmful dioxin or a bromine system dioxin prototype may generate in incineration disposal, disposal of burned ash is troublesome. Especially at the high water absorption agent for disposable disposable diapers currently used for the current large quantity, although the bridge formation object of sodium polyacrylate is used abundantly, this thing does not rot by reclamation, but in order that the strong-base nature matter may remain in a large quantity into burned ash, by incineration, that disposal is difficult. On the other hand,

the polylactic acid of the chemosynthesis mold which is the polyhydroxy butyrate or biodegradability which is microorganism production mold plastics, Although poly caprolactone polyalkylene succinate, polyvinyl alcohol, the cellulose that carried out chemical modification, or starch is proposed Are a heavy price, workability is inferior, a mechanical strength is inadequate, or biodegradability is inferior, and the demand of a commercial scene is not filled thoroughly. Moreover, although the thing using the mixture of starch and a petrochemical plastic is also proposed, what does not have biodegradability intrinsically remains and it is a problem. Furthermore, although the mixture of starch and a urea is proposed by JP,2804523,B, in order to collapse with water reversibly, in the field which this invention aims at, it is completely lacking in practicability.

[0003]

[Problem to be solved by the invention] Building materials [like the high water absorption agent for disposable disposable diapers, a wall board, wallpaper, a crown plate, or a partition] whose this invention is, As an agricultural material like the film for a soil coat, or the film for greenhouses, a seedling raising pot, the covering material of a seed, the covering film for road law sides or a greening material like a soil conditioner, a water paint, or a recorded material for printing When it uses in reclamation abolition or a nature, biodegradation is carried out with the bacteria in soil etc., and capacity becomes less substantially, and when incineration processing is carried out, it aims at offering a biodegradability ingredient which deleterious material like dioxin or the strong-base nature matter does not generate.

[0004]

[Means for solving problem] [this invention person / the biodegradable composition containing the biodegradability compound which constructed the bridge with the compound which has 2-10 acrylyl groups in the biodegradability compound which has active hydrogen] It found out excelling as the high water absorption agent for disposable diapers, building materials, an agricultural material, a greening material, a water paint, or a recorded material for printing.

[0005]

[Mode for carrying out the invention] This invention is explained to a detail below. As a biodegradability compound which has active hydrogen used by this invention Starch, hydroxyethyl starch, methyl starch, methyl hydroxyethyl starch, The starch or the cellulose like carboxymethyl starch and trimethyl propyl ammonium starch which may be permuted, Hydroxyethyl cel A sirloin, methyl cellulose, methyl hydroxyethyl cellulose, The cellulose, polyethylene glycol, or glycerol like a carboxymethyl cellulose and a trimethyl propyl ammonium cellulose which may be permuted, Diglycerol, a glycerol like polyglycerin which may polymerize, Or sucrose, a sorbitol, or polyethylene-glycol diamino termination, Alkylene polyol PORIAMINO termination like GURISERINTORISU polyethylene-glycol triamino termination and trimethylol propane tris polyethylene-glycol triamino termination etc. is raised. Although sodium salt can also be used about aforementioned carboxymethyl

starch or an aforementioned carboxymethyl cellulose, the thing of a free-acid mold is desirable. Although the thing originating in grain, such as a potato, a cone, tapioca, wheat, or rice, is raised as starch, the starch of the U.S. origin in the moldability of a constituent, a mechanical strength, etc. is desirable. Since the starch which originates in rice although a Reason is not clear is remarkably small compared with particle diameter being several microns and the particle diameter of the starch originating in other grain being tens of microns, its surface area is large, and the mechanical strength of the constituent generated since there are many parts which carry out hydrogen bond considers it to be a high thing. Therefore, when using the starch originating in other grain, if atomization processing is carried out with a Sand grinder or a grinder like a ball mill, the same effectiveness will be acquired, but it becomes the factor of the part cost hike whose down stream processing increases, and a disadvantageous thing cannot be overemphasized. moreover -- from the field that loading on agricultural policy peculiar to Japan, such as old rice or old rice, can be processed about amylum oryzae -- the time -- ** -- suiting -- ** -- it can say .

[0006] When a bridge is constructed with the biodegradability compound which has active hydrogen as amount of the urea used used by this invention, zero to 3 bulk density is raised to the biodegradability compound which has active hydrogen, and a suitable mixing ratio is chosen according to the purpose of use. receiving starch on the other hand, when gel formation is carried out and it is used as a biodegradable composition non-constructing a bridge with starch -- 0.1-2 -- 0.3 to 1.5 bulk density is raised preferably. The gel generated when more [when less than 0.1, the rate of gelling of a constituent was slow, and] than 2 becomes weak.

[0007] [the compound which has the acrylyl group used by this invention] As described above, have an acrylamide radical or an acrylic ester group, and specifically 1, 3, and 5-thoria KURIROIRU hexahydrotriazine or a condensation polymerization object of acrylamide like methylenebis acrylamide, The reactant of oligo chitosan and acryloyl chloride, or the reactant of the oligo amine compound and acryloyl chloride like the reactant of a polyethylene-glycol diamine termination object and acryloyl chloride, Acrylic ester of a polyol compound like polyethylene-glycol JIAKURIRU ester, glucose oligo acrylic ester or glycerol oligo acrylic ester, and trimethylolethane oligo acrylic ester etc. is raised. As the amount used, 0.01 to 2 equivalent ratio is raised to the biodegradability compound which has active hydrogen, and it is suitably chosen according to the purpose of use.

[0008] or [it being desirable in this invention to carry out by acidity - neutrality as for the crosslinking reaction of the biodegradability compound which has active hydrogen, and the compound which has an acrylyl group, and specifically using an organic acid together] -- or it is carried out, without using together. When reacting by alkalinity, it is desirable to use an inorganic base and an organic base specifically like the 4th class ammonium hydroxide not using alkali metal hydroxide etc. Since it is not desirable that an alkaline substance ****** in a product, while washing removes, or it is necessary after a reaction to neutralize with an acid and remarkably disadvantageous on a production process, when a product is

discarded, it is not desirable that alkali metal etc. is condensed in burned ash, either.
[0009] In this invention, further, to a Plastic solid, the water-soluble retarder thinner which has hydrogen bond nature can be added in order to give the improvement in absorptivity, or plasticity. Specifically The polyethylene glycol alkyl ethers like the polyethylene-glycol monomethyl ether and polyethylene-glycol wood ether Polyethylene-glycol monoacetyl, polyethylene-glycol mono-succinate (half-ester half carboxylic acid), or polyethylene-glycol acyl ester species like both-ends maleate (half-ester half carboxylic acid) of a polyethylene glycol, Poly glycerol fatty acid ester etc. is raised. As the amount used, 0.01 to 0.5 bulk density is raised to a constituent. If less than 0.01, plasticity will become inadequate, and if more than 0.5, the reinforcement of a molding body will fall.
[0010] As fibrous material of natural material origin used in this invention, yarn or cloth, such as cotton, wool, and silk, are torn thinly, or the thing which or was and carried out it like this, or paper is raised. What is called old clothes besides being the rejected goods at the time of producing fiber and paper, waste, waste, etc. as a supply source of such a thing or used paper is raised. It is the actual condition that such a thing currently reused effectively once has laid on the shelf by various change of a situation spending it, and according to this invention, such a thing will be used effectively whenever [re-]. That is, composite with the crosslinking reaction object of the biodegradability compound and the poly acryloyl compound which have active hydrogen can be formed by the ability using fibrous material of natural product origin as the aggregate, and it can use effectively for building materials etc.
[0011] [the biodegradability compound which has the KARUBO hydrazide radical or amino group used in this invention] It is effective in adsorption decomposition of formaldehyde, and specifically Horse mackerel pick dihydrazide, tele free-wheel-plate RIKKU dihydrazide, the VISCA RUBOHIDORAJINOECHIRU isopropyl hydantoin, The KARUBO hydrazide radical content compound or monoethanolamine like polyacrylamide PORIKARUBO hydrazino ethylene, a diamine termination polyethylene glycol, a lysine, an arginine, and an amino-group content compound like epsilon-aminocaproic acid are raised. As for the amount used, 0.2 bulk densities are raised from 0.05 to a constituent. If more [if less than 0.05, decomposition of formaldehyde is inadequate, and] than 0.2, the reinforcement of a constituent will fall.
[0012] In this invention, when a biodegradability group living thing is used as a high water absorption agent, a water absorption rate improves by adding a biodegradability surfactant. Fatty acid ester of sucrose or fatty acid ester of a PORIGU serine is raised, and, specifically, 0 to 3% of the addition is raised to constituent full weight.
[0013] About shaping of the biodegradable composition of this invention, the following methods are possible. The compound which has the compound and the poly acrylyl group which have active hydrogen in water is added. An organic acid or the 4th class ammonium hydroxide is added if needed, the compound which has a urea, starch, hydrogen bond nature water solubility retarder thinner, the fibrous material of natural product origin, a

KARUBO hydrazide radical, or an amino group if needed further is added, suitable stirring is carried out, and a homogeneity slurry is obtained. A film-like Plastic solid is acquired by applying this slurry on a biaxial drawing polypropylene film (OPP film), for example, and carrying out stoving.

[0014] It is also possible to process it into a spacial configuration further by the usual method of pressing, heating the above mentioned film-like Plastic solid if needed.

[0015]

[Working example] Although an example explains this invention to a detail further below, this invention is not limited to these examples, unless the summary is exceeded. In addition, the section shall express the meaning of the weight section.

[0016] [Example 1] 100 copies of amylum oryzae, 100 copies of ureas, 100 copies of glycerols, 1, 3, 30 copies of 5-thoria KURIROIRU hexahydrotriazine, and three copies of glycolic acids were added to 500 copies of water, and homogeneity slurry slime was adjusted using the homogenizer. After heating this slime for 90 minutes at 120 degrees C, it dried at 90 degrees C for 3 hours, subsequently it ground, and the white powder of 310 copies was obtained. When 100 copies of physiological salines were added to these ten copies of powder, powder absorbed and swelled the physiological saline. Moreover, when this powder was laid underground into soil and having been checked one year afterward, powder was assimilated to soil.

[0017] [Example 2] In 1000 copies of water, 100 copies of amylum oryzae, 50 copies of ureas, 20 copies of polyglycerin, 100 copies of hydroxyethyl methyl cellulose, 1, 3, 30 copies of 5-thoria KURIROIRU hexahydrotriazine, and three copies of glycolic acids were added, and homogeneity slurry slime was adjusted using the homogenizer. After heating this slime for 90 minutes at 120 degrees C, it dried at 90 degrees C for 3 hours, subsequently it ground, and the white powder of 250 copies was obtained. When 150 copies of physiological salines were added to these ten copies of powder, powder absorbed and swelled the physiological saline. Moreover, when this powder was laid underground into soil and having been checked one year afterward, powder was assimilated to soil.

[0018] [Example 3] 100 copies of hydroxyethyl cellulose, 20 copies of methylenebis acrylamides, and four copies of maleic acids were added to 1000 copies of water, and homogeneity slurry slime was adjusted using the homogenizer. Used the applicator on the OPP film, after applying this slime so that it may be set to desiccation 0.5mm in thickness and neglecting it for 90 minutes in [of 120 degrees C] a dry air style, it was made to exfoliate, and the film-like Plastic solid was acquired. This film was easy to be rich in flexibility and to bend by hand. Moreover, when this film was pulled by hand, elongation was hardly shown. On the other hand, when this film was laid underground into soil and having been checked one year afterward, the film was assimilated to soil. Moreover, with starch paste, the wood slab could be pasted and this film has been used as wallpaper.

[0019] [Example 4] 100 copies of methyl cellulose, 20 copies of methylenebis acrylamides, and four copies of maleic acids were added to 1000 copies of water, and homogeneity

slurry slime was adjusted using the homogenizer. 40 copies of things which tore the cotton cloth in width of 1mm were added to this slime, and homogeneity slurry slime was adjusted to it using the mortar. Used the applicator on the OPP film, after applying this slime so that it may be set to desiccation 5mm in thickness and neglecting it for 90 minutes in [of 120 degrees C] a dry air style, it was made to exfoliate, and the tabular Plastic solid was acquired. Moreover, it could fix to the wooden flask with the nail, and this plate has been used as a wallplate. On the other hand, when this plate was laid underground into soil and having been checked one year afterward, the plate was assimilated to soil.

[0020] [Example 5] In 200 copies of water, 100 copies of amylum oryzae, 50 copies of ureas, 20 copies of polyethylene glycols, 50 copies of hydroxypropyl starch, ten copies of glyceryl triacrylate, two copies of tartaric acids, and ten copies of polyacrylamide PORIKARUBO hydrazino ethylene were added, and homogeneity slurry slime was adjusted using the homogenizer. Used the applicator on the OPP film, after applying this slime so that it may be set to desiccation 2mm in thickness and neglecting it for 90 minutes in [of 90 degrees C] a dry air style, it was made to exfoliate, and the film-like Plastic solid was acquired. It was rich in flexibility, and this film was easy also for bending by hand, and when pulled by hand, it hardly showed elongation. On the other hand, when this film was laid underground into soil and having been checked one year afterward, the film was assimilated to soil. Moreover, it was neglected in the enclosure of 1 RYUBE which has the gaseous-phase section which made these 50 copies of films the shape of a chip of a 2mm angle, and adjusted them to formaldehyde 100ppm. The formaldehyde smell was not accepted when checked one week afterward.

[0021] [Example 6] 30 copies of amylum oryzae, 30 copies of ureas, 20 copies of erythritol, 100 copies of hydroxyethyl methyl cellulose, 20 copies of trimethylolpropane triacrylate, and two copies of glycolic acids were added to 1000 copies of water, and homogeneity slurry slime was adjusted using the homogenizer. Used the applicator on the OPP film, after applying this slime so that it may be set to desiccation 0.5mm in thickness and neglecting it for 60 minutes in [of 100 degrees C] a dry air style, it was made to exfoliate, and the film-like Plastic solid was acquired. It was rich in flexibility, and this film was easy also for bending by hand, and when pulled by hand, it showed slight elongation. On the other hand, when this film was laid underground into soil and having been checked one year afterward, the film was assimilated to soil. Moreover, this film was pressed in 100 degrees according to the bottom of heating, and a conventional method, and the seedling raising pot was molded. Soil and the seeds of basil were put into this, and as a result of performing water and ** for three months, it budded. The pot was able to maintain reinforcement and was able to ****** it in the field as it was.

[0022] [Example 7] (adjustment of a cross linking agent) After adding the Jeffamine ED600 (polyalkylene glycol diamine termination, HUNTSMAN products) 60 copy to 200 copies of water and cooling at 0 degree C, two copies of acryloyl chloride was added at 0 to 10 degrees C. After reacting at temperature how for 5 hours, temperature up was carried out

to 50 degrees C, and it reacted at this temperature for 3 hours. (Adjustment of a constituent) 100 copies of carboxymethyl-cellulose free acids, 100 copies of methyl cellulose, three copies of carbon black, 100 copies of polyethylene glycols, and said cross linking agent were added to 800 copies of water, and homogeneity slurry slime was adjusted to it using the homogenizer. Used the applicator on the OPP film, after applying this slime so that it may be set to desiccation 2mm in thickness and neglecting it for 120 minutes in [of 120 degrees C] a dry air style, it was made to exfoliate, and the film-like Plastic solid was acquired. It was rich in flexibility, and this film was easy also for bending by hand, and when pulled by hand, it showed slight elongation. On the other hand, when this film was laid underground into soil and having been checked one year afterward, the film was assimilated to soil. Moreover, when the surface of soil was covered with this film, soil temperature was higher than atmospheric temperature 20 degrees. Possibility that it could use as a covering film of a field was found out.

[0023] [Example 8] The film was fabricated like the example 3 except using chitosan instead of the polyacrylamide PORIKARUBO hydrazino ethylene in an example 5. About adsorption of formaldehyde, or decomposition in soil, the good result was obtained like the example 3.

[0024] [Example 9]

(Atomization of potato starch) After adding 100 copies of potato starch (46 microns of average particle systems) into 1000 copies of water and performing atomization for 48 hours using the glass bead and Sand grinder of the diameter of 1mm, the wire gauze separated the glass bead and the slurry was obtained. Mean particle diameter was 8 microns.

(Adjustment of a constituent, assessment) Instead of the water in an example 1, and amylum oryzae, it evaluated by adjusting a constituent like an example 1 except using said atomized potato starch slurry. The result was good.

[0025] [Example 10]

(Adjustment of starch-urea system gel) When 100 copies of amylum oryzae and 100 copies of ureas were added to 100 copies of water and it was neglected under the room temperature, it gelled. It ground, after drying at 30 degrees C, the bottom of the reduced pressure to 10mmHg of this gel, and.

(Adjustment of constituent-1) Said 100 copies of starch-urea system gels, and example - 100 copies of powder adjusted by 2 was mixed using the coffee mill.

(Adjustment of constituent-2) 100 copies of bentonites, and example - 100 copies of powder adjusted by 2 was mixed using the coffee mill.

(Adjustment of constituent-3) Said 67 copies of starch-urea system gels, 67 copies of bentonites, and example - 67 copies of powder adjusted by 2 was mixed using the coffee mill.

(Assessment) The physiological saline was added to the following powder and it evaluated about the reinforcement of the water absorption rate, the coefficient of water absorption,

and the water absorption object. A coefficient of water absorption is expressed with the bulk density of the physiological saline which absorbed water to powder weight. In addition, it is desirable that it is hard that a coefficient of water absorption has that a water absorption rate is [much] quick as for the reinforcement of a water absorption object.
A water absorption rate A coefficient of water absorption The reinforcement starch-urea system gel of a water absorption object Quick Five bulk densities A slurrying bentonite Late 10 Slurrying example - Two powder A mean 15 Hard constituent - Powder of 1 It is quick. 20 Hard constituent - Two powder It is quick. 20 Hard constituent - Three powder It is quick. 20 Hard [0026] [Example 11] In 1000 copies of water, 30 copies of amylum oryzae, 15 copies of ureas, ten copies of sorbitols, 100 copies of trimethyl propyl ammonium starch, 50 copies of hydroxyethyl cellulose, 30 copies of methylenebis acrylamides, and five copies of carbon black were added, and homogeneity slurry slime was adjusted using the homogenizer. With the hair dryer, for 20 minutes, it heated and this slime was dried, after using and applying a paint brush to a wall board. At the time of paint, it was rare for a coating to hang down and it found out possibility that it could use as a coating.
[0027] [Example 12] Homogeneity slurry slime was adjusted for 100 copies of amylum oryzae, 50 copies of ureas, 30 copies of diglycerols, 200 copies of HIDOTOKISHI ethyl methyl cellulose, 30 copies of trimethylol triacrylate, and five copies of glycolic acids to 1000 copies of water using the homogenizer. An applicator is used for an electrophotography form, and after applying this slime so that it may be set to desiccation 1mm in thickness, it was dried for 20 minutes 100 degrees C. When printed using the ink jet printer, the good printing property was shown.
[0028] [Example 13] Homogeneity slurry slime was adjusted for 100 copies of diglycerols, 200 copies of HIDOTOKISHI ethyl methyl cellulose, 1, 3, 30 copies of 5-thoria KURIROIRU hexahydrotriazine, and five copies of glycolic acids to 1000 copies of water using the homogenizer. For 120 degrees C and 90 minutes, after heating, it ground and 304 copies of white powder was obtained. When 100 copies of physiological salines were added to these ten copies of powder, powder absorbed and swelled the physiological saline. Moreover, when this powder was laid underground into soil and having been checked one year afterward, powder was assimilated to soil.
[0029] [Example 14] Homogeneity slurry slime was adjusted for 100 copies of ureas, 200 copies of HIDOTOKISHI ethyl methyl cellulose, 1, 3, 30 copies of 5-thoria KURIROIRU hexahydrotriazine, and five copies of glycolic acids to 1000 copies of water using the homogenizer. For 120 degrees C and 90 minutes, after heating, it ground and 300 copies of white powder was obtained. When 100 copies of physiological salines were added to these ten copies of powder, powder absorbed and swelled the physiological saline. Moreover, when this powder was laid underground into soil and having been checked one year afterward, powder was assimilated to soil.
[0030] [Example 15] Homogeneity slurry slime was adjusted for 100 copies of glycerols, 100 copies of ureas, 200 copies of HIDOTOKISHI ethyl methyl cellulose, 1, 3, 50 copies of

5-thoria KURIROIRU hexahydrotriazine, and five copies of glycolic acids to 1000 copies of water using the homogenizer. For 120 degrees C and 90 minutes, after heating, it ground and 410 copies of white powder was obtained. When 100 copies of physiological salines were added to these ten copies of powder, powder absorbed and swelled the physiological saline. Moreover, when this powder was laid underground into soil and having been checked one year afterward, powder was assimilated to soil.

[0031] [Example 16] In 1000 copies of water, 100 copies of glycerols, 100 copies of ureas, Homogeneity slurry slime was adjusted for 200 copies of HIDOTOKISHI ethyl methyl cellulose, 1, 3, 50 copies of 5-thoria KURIROIRU hexahydrotriazine, five copies of glycolic acids, and eight copies of PORIGU serine mono-laurate using the homogenizer. For 120 degrees C and 90 minutes, after heating, it ground and 407 copies of white powder was obtained. When 100 copies of physiological salines were added to these ten copies of powder, powder absorbed the physiological saline more promptly than the case of an example 15, and swelled it. Moreover, when this powder was laid underground into soil and having been checked one year afterward, powder was assimilated to soil.

[0032] [Example 17] 200 copies of 90-degree C hot water was added to 100 copies of amylum oryzae, and it dissolved in it. Five copies of methylenebis acrylamides and two copies of glycolic acids were added to this, for 120 degrees C and 90 minutes, after heating, it ground and 103 copies of white powder was obtained. When 100 copies of physiological salines were added to these ten copies of powder, powder absorbed and swelled the physiological saline. Moreover, when this powder was laid underground into soil and having been checked one year afterward, powder was assimilated to soil.

[0033] [Example 18] 200 copies of 90-degree C hot water was added to 100 copies of potato starch, and it dissolved in it. 1, 3, three copies of 5-thoria KURIROIRU hexahydrotriazine, and one copy of glycolic acid were added to this, for 120 degrees C and 90 minutes, after heating, it ground and 100 copies of white powder was obtained. When 100 copies of physiological salines were added to these ten copies of powder, powder absorbed and swelled the physiological saline. Moreover, when this powder was laid underground into soil and having been checked one year afterward, powder was assimilated to soil.

[0034] [Example 19] 200 copies of 90-degree C hot water was added to 100 copies of amylum oryzae, and it dissolved in it. 100 copies of methyl hydroxyethyl starch, one copy of methylenebis acrylamide, and one copy of glycolic acid were added to this, for 120 degrees C and 90 minutes, after heating, it ground and 200 copies of white powder was obtained. When 100 copies of physiological salines were added to these ten copies of powder, powder absorbed and swelled the physiological saline. Moreover, when this powder was laid underground into soil and having been checked one year afterward, powder was assimilated to soil.

[0035]

[Effect of the Invention] The biodegradable composition of this invention fits a high water

absorption ingredient, a building material, the charge of agricultural lumber, a greening material, a coating, or a recorded material, and moreover can be recycled, and is easy to discard.

[Translation done.]